



Nantucket Memorial Airport Master Plan Update

Appendix 2- Coastal Resources



2015

Prepared for:
Nantucket Memorial Airport Commission

Prepared By

JACOBS™

Jacobs Engineering

In association with



Robin Lee Monroe & Associates



Nantucket Memorial Airport Master Plan Update

Appendix 2 – Coastal Resources



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Memorandum

TO: Bill Richardson, Project Manager

FROM: Lars Carlson, Ph.D., PWS

DATE: January 24, 2014

SUBJECT: Nantucket Memorial Airport
Master Plan – Task 6B
Evaluation of Coastline Changes at Runway 6

Introduction:

The following paragraph is included in the scope of work for the Nantucket Memorial Airport (ACK) Master Plan. The purpose of this memo is to describe the methods and results of the requested evaluation.

1. Evaluate Recent Coastline Changes at the Approach End of Runway 6

In order to gain an understanding of potential future changes at the approach end of RW 6, Jacobs will assemble existing readily available information on changes that have occurred in the recent past. This will include examination of available historical aerial imagery and shoreline change information prepared by the Massachusetts Office of Coastal Management. Although past changes cannot be assumed to represent an accurate estimate of future changes, they may be useful in identifying trends in erosion and/or accretion that could impact the Airport.

Methods:

The Commonwealth of Massachusetts Office of Coastal Zone Management has undertaken a research project to map changes in the state's shoreline over time. The StormSmart Coasts project is described on the Department's web site as follows:

(<http://www.mass.gov/eea/agencies/czm/program-areas/stormsmart-coasts/shoreline-change/>)

StormSmart Coasts - Massachusetts Shoreline Change Project

To help make informed decisions, coastal managers, shorefront landowners, and potential property buyers need information on shoreline trends, including erosion and accretion rates. The goal of the Massachusetts Office of Coastal Zone Management (CZM) Shoreline Change Project is to develop and distribute scientific data that will support local land-use decisions.

Nantucket Memorial Airport
Evaluation of Coastline Changes at Runway 6

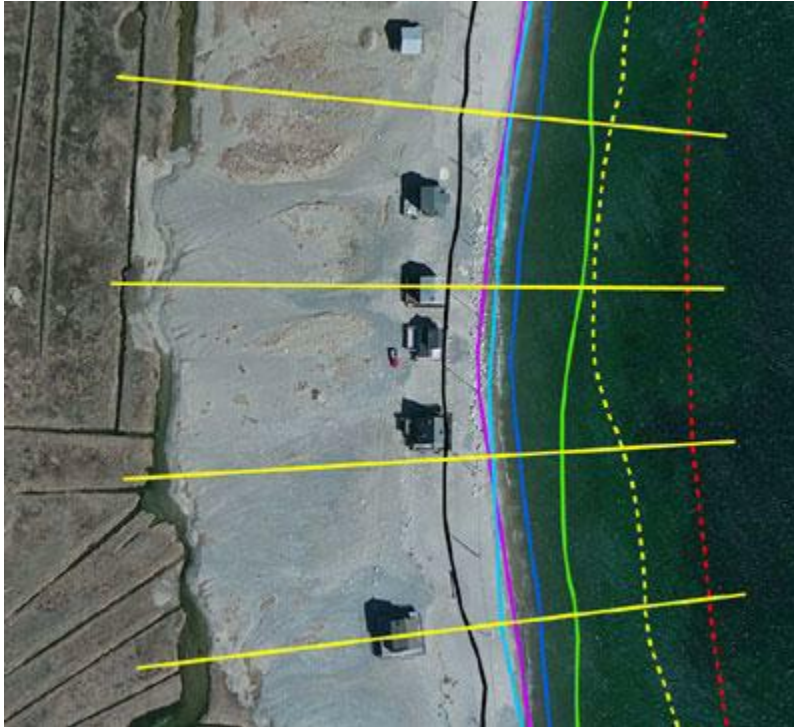


Figure 1: Shorelines with Transects

CZM's Shoreline Change Project illustrates how the shoreline of Massachusetts has shifted between the mid-1800s and 2009. Using data from historical and modern sources, up to eight shorelines depicting the local high water line (i.e., the landward limit of wave runup at the time of local high tide) have been generated with transects at 50-meter (approximately 164-foot) intervals along the ocean-facing shore. For each of these more than 26,000 transects, data are provided on net distances of shoreline movement, shoreline change rates, and uncertainty values. CZM has incorporated these shoreline change data into MORIS, the Massachusetts Ocean Resource Information System, and has developed a customized Shoreline Change Browser within the MORIS web-based coastal management tool.

Jacobs engineering utilized the CZM Shoreline Change Project datalayers available from MassGIS to prepare the attached figures showing recent trends at several beaches on Nantucket's south coast. (Refer to Figure 2, Locus Map.) Changes at Nobadeer Beach (seaward of ACK) were compared to other nearby beaches. The changes are summarized below.

The following beaches were reviewed:

Cisco – Figure 3

Surfside – Figure 4

Nobadeer – Figure 5

Tom Nevers – Figure 6

Results:

The shoreline change data show that the beaches have been in constant change over the entire period evaluated. Based on the earliest maps available (1845), there has been a general trend of erosion at Nobadeer Beach, where the shoreline has retreated over 1,200 feet in that timeframe. However, the figures also show that all sections of the south coast have experienced periods of accretion during various time frames. The timelines for and extent of erosion and accretion varied among beaches.

At Nobadeer Beach (Figure 5) at ACK, the data show a period of accretion between 1994 & 2000, but shoreline retreat between 2000 & 2009. As of 2009 (the most recent data published), there had been a net beach gain of approximately 80 feet as compared to 1994.

At Cisco Beach (Figure 3) the data also show a period of accretion between 1994 & 2000, but less overall growth as compared to Nobadeer. The Cisco Beach shoreline also retreated between 2000 & 2009, but unlike Nobadeer, the net change was approximately 100 feet of beach loss as compared to 1994.

At Surfside beach, the data suggest a net gain in land as compared to 1845, including accretion between 1994 and 2000. As of 2009, the net change compared to 1994 differed along the beach, with western portions showing net loss and eastern portions showing net gain.

A similar trend was shown at Tom Nevers, with accretion between 1994 and 2000. And the net change compared to 1994 with the western portions showing net loss and eastern portions showing net gain.

Discussion:

The data demonstrate that the beaches on the south coast of Nantucket are highly variable, exhibiting significant changes over relatively short periods of time. The data also illustrate that beaches were not experiencing the same conditions at a given time over the period studied, with some experiencing erosion at the same time others were accreting.

This study made no attempt to correlate shoreline change trends with coastal management activities on the various beaches. However the dynamism shown suggests an opportunity to capitalize on periods of accretion through active beach management that encourages stabilization of the new beach with dune vegetation. By encouraging dune growth during periods of accretion, the severity of land loss during periods of erosion can be reduced.

Nobadeer Beach at ACK has shown a net gain in beach since 1994, but has been eroding since 2000. To maximize the benefits of the accretion since 1994, we recommend expanding active beach management at Nobadeer to better stabilize the beach and dune system and help solidify the gains.

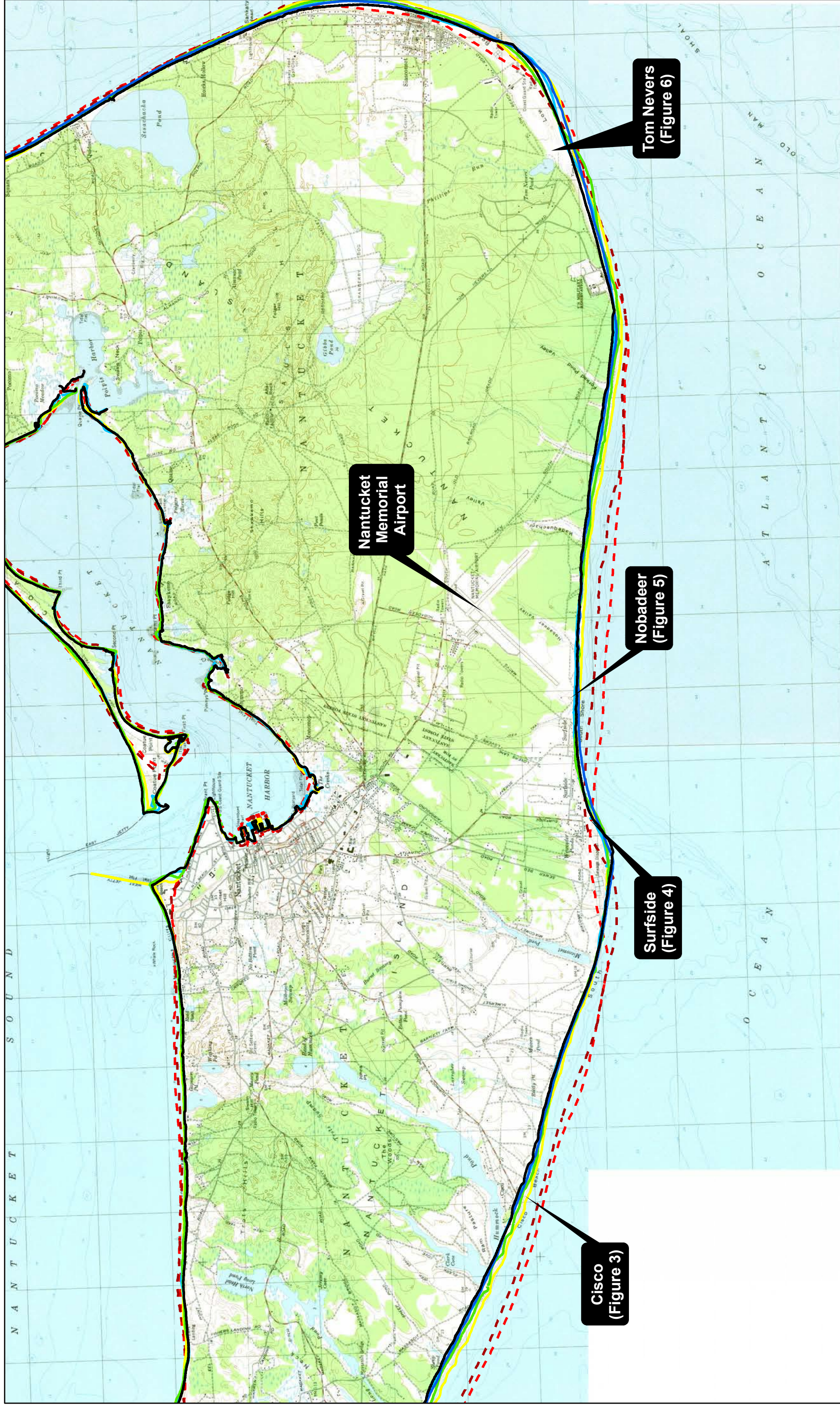
Recommendations:

We recommend that the Airport work with the Town of Nantucket Beach Manager and the Coastal Management Plan (CMP) Work Group to develop and implement additional beach & dune management actions at Nobadeer Beach. Potential improvements may include but would not be limited to the following:

- Form a working group to review beach management and develop future improvements
- Improve signage to better define access points & trails
- Install fencing to better define vehicle access route & avoid sensitive areas
- Install fencing to better define pedestrian access routes & trails through the dunes
- Install fencing to protect the toe of the foredune & other sensitive areas
- Install American beach grass (*Ammophila breviligulata*) plantings to stabilize bare areas



Figure 7: Aerial View of Nobadeer Beach, Showing Multiple Trails Through the Dunes



Prepared by:

JACOBS

Date: December 23, 2013

Sources:
MassGIS - Comm. of Mass, EOEEA
Orthophoto Imagery, April 2008
MORIS.SHORELINES_ARC,
June 2013

Legend

--- 1846 --- 1955 --- 1994 --- 2009
--- 1887 --- 1978 --- 2000

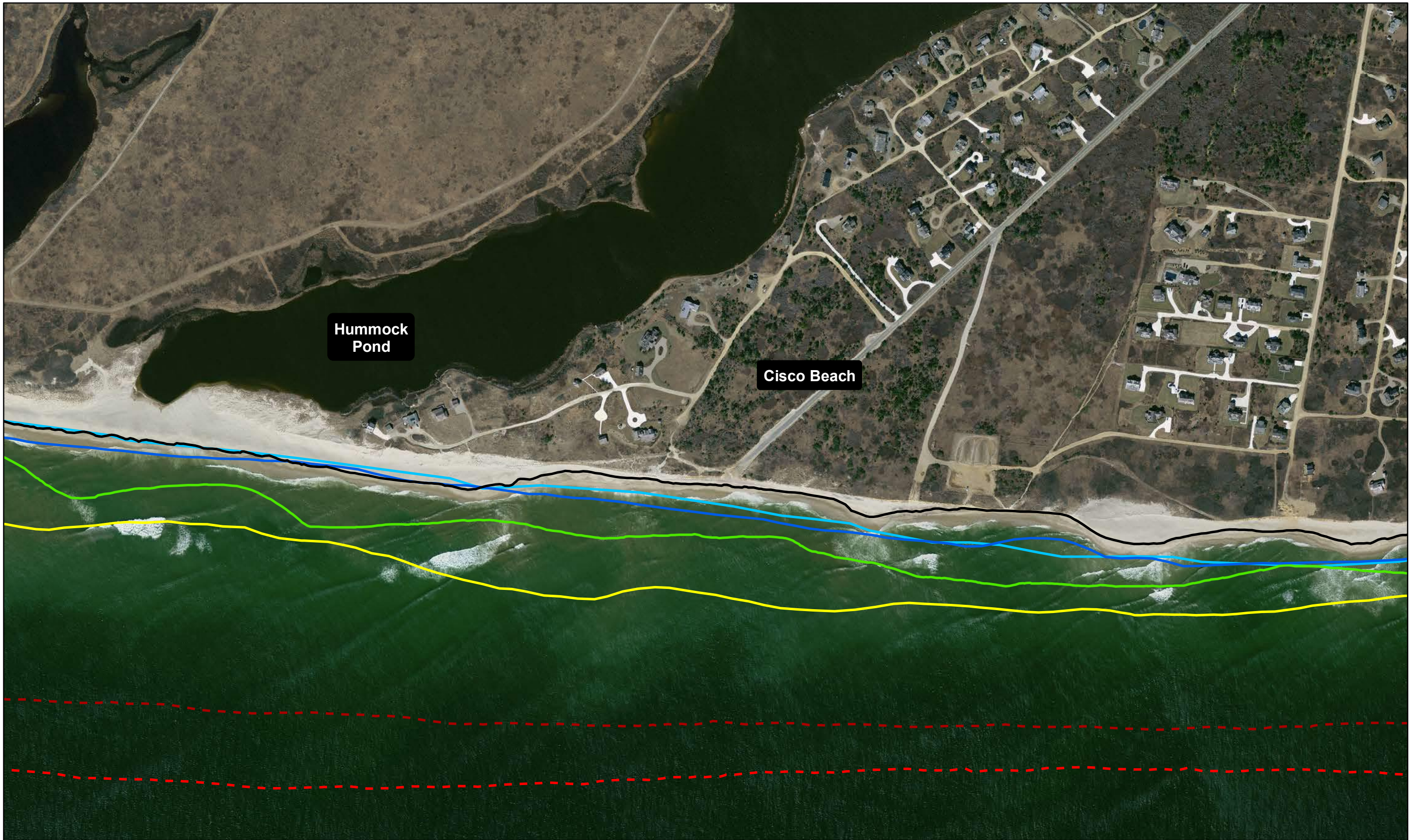


Nantucket Airport Commission Master Plan - Coastal Management



Figure 2

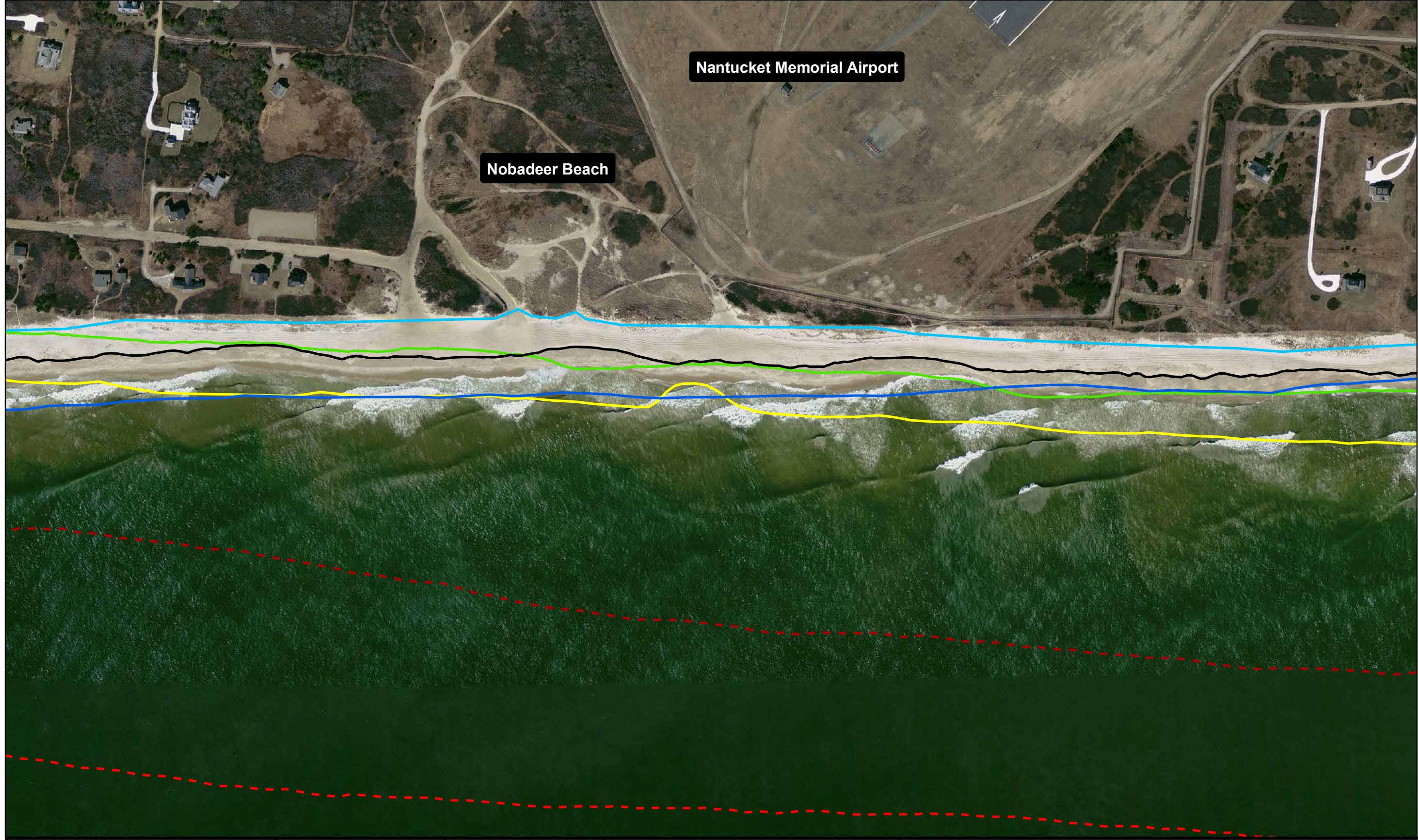
Locus Map Evaluation of Coastline Cha

Coastline Changes



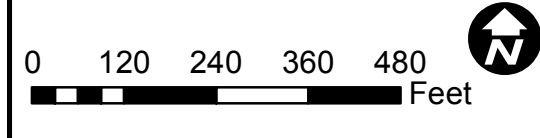


<p>0 120 240 360 480 Feet</p> 	<p>Prepared by: JACOBS Date: December 23, 2013</p>	<p>Sources: MassGIS - Comm. of Mass. EOEEA Orthophoto Imagery, April 2008 MORIS.SHORELINES_ARC, June 2013</p>	<p>Legend</p> <table border="0"><tr><td>— 1846</td><td>— 1955</td><td>— 1994</td><td>— 2009</td></tr><tr><td>— 1887</td><td>— 1978</td><td>— 2000</td><td></td></tr></table>	— 1846	— 1955	— 1994	— 2009	— 1887	— 1978	— 2000		 <p>Nantucket Airport Commission Master Plan - Coastal Management</p>	<p>Figure 4 High Water Shorelines Surfside Beach 1846-2009</p>
— 1846	— 1955	— 1994	— 2009										
— 1887	— 1978	— 2000											



Nantucket Memorial Airport

Nobadeer Beach



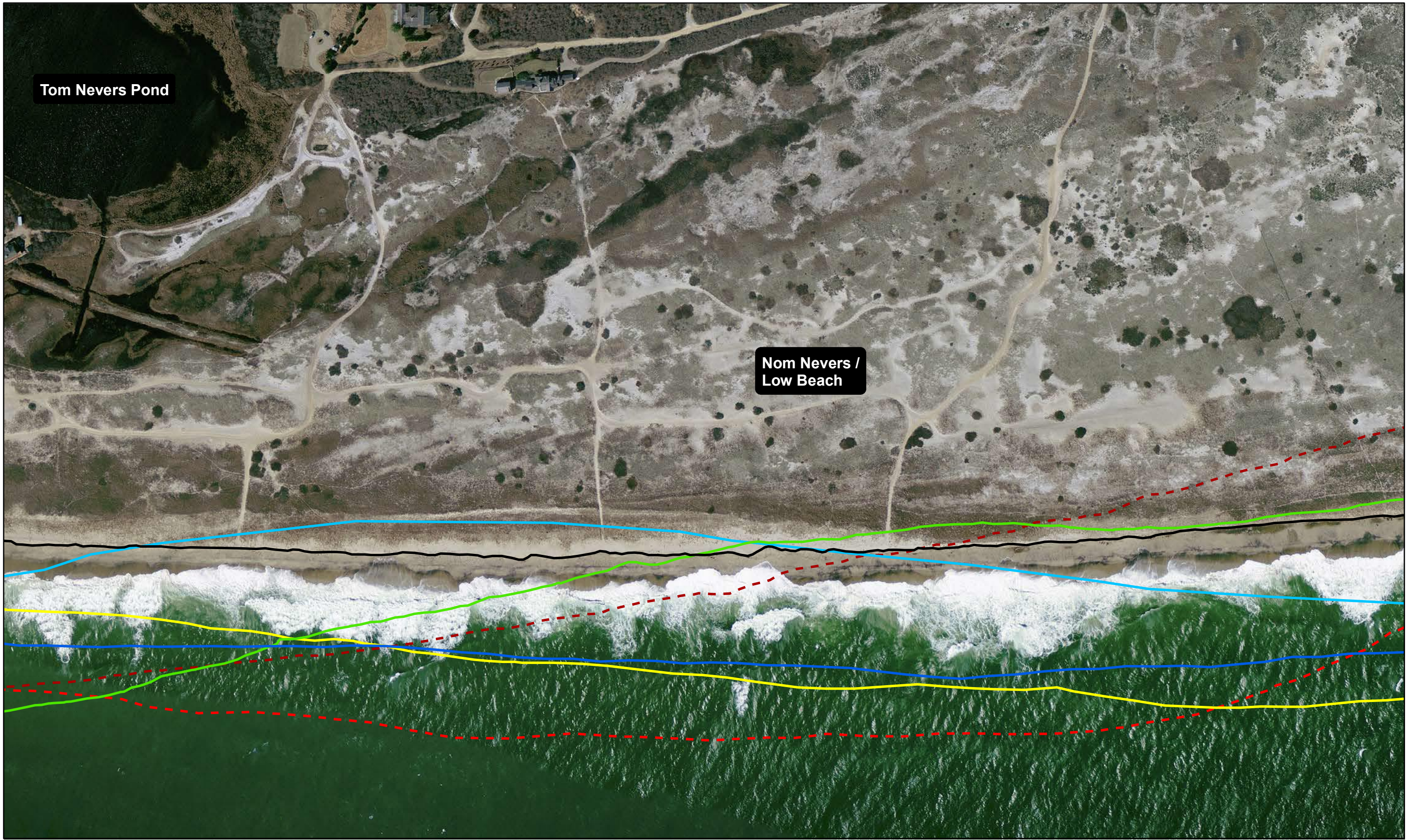
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Legend
- - 1846 1955 1994 — 2009
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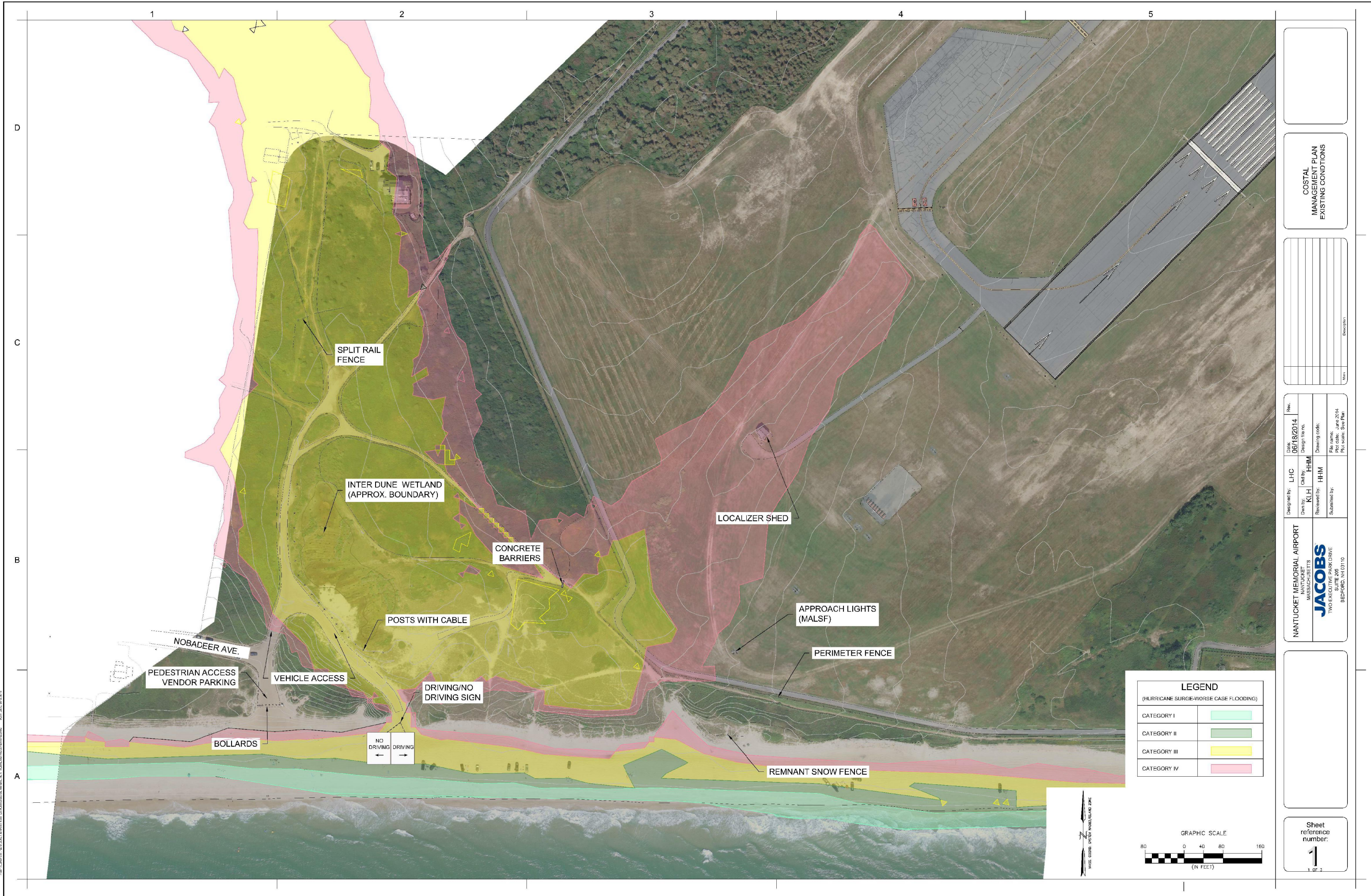
ACK Nantucket Airport Commission
Master Plan - Coastal Management

Figure 5
High Water Shorelines
Nobadeer Beach
1846-2009





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— 1846	— 1955	— 1994	— 2009										
— 1887	— 1978	— 2000											



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**COSTAL
MANAGEMENT PLAN
EXISTING CONDITIONS**

Rev.	Description

Designed by: LHC	Date: 06/19/2014	Rev.
Drawn by: KLH	Design items: HHM	
Reviewed by: HHM	Drawing code: HHM	
Submitted by:	File name: Plot date: June 2014 Plot scale: Site Plan	

NANTUCKET MEMORIAL AIRPORT
MASSACHUSETTS
JACOBS
TWO EXECUTIVE PARK DRIVE
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BEDFORD, NH 03110



POSTERIZATION - NANTUCKET MEMORIAL AIRPORT LANDSCAPE MANAGEMENT PLAN APPROVED WORKSHEET - TRANSMISSION - PLAT DATE: 06/18/2014

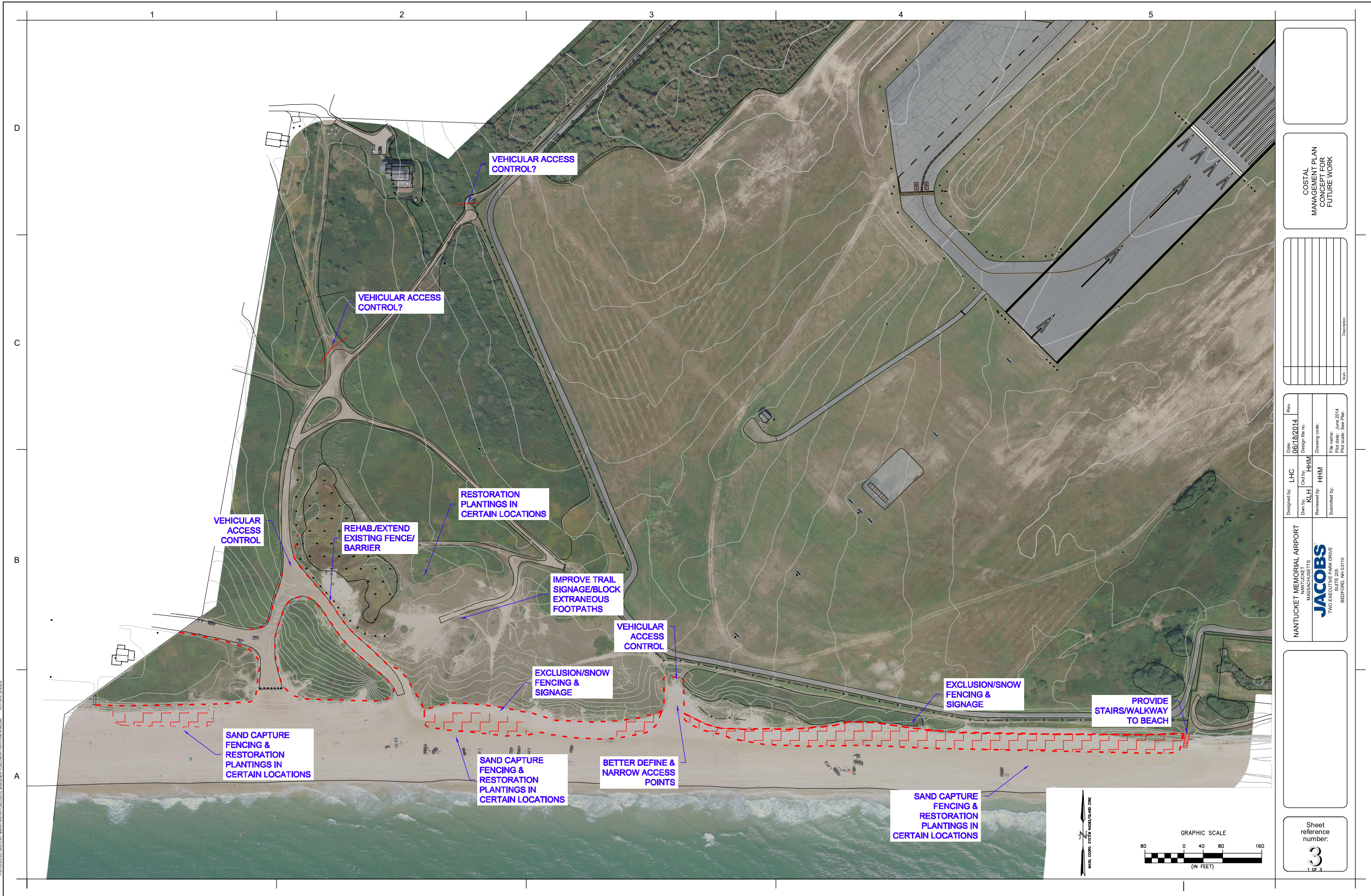
COSTAL
MANAGEMENT PLAN
PROPOSED WORK
INITIAL PHASE

Rev.	Description

Designed by:	LHC	Rev.	06/18/2014
Dwn by:	KLH	Design file no.	
Reviewed by:	HMM	Drawing code:	
Submitted by:	HMM	File name:	
		Plot date:	June 2014
		Plot scale:	See Plan

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POSTED: 05/15/2014 - NANTUCKET AIRPORT MASTER PLAN/CONCEPT FOR FUTURE WORKS - PLOT DATE: 05/15/2014

COSTAL
MANAGEMENT PLAN
CONCEPT FOR
FUTURE WORK

Rev.	Description

Designed by:	LHC	Rev.	06/18/2014
Dwn by:	KLH	Design file no.	
Reviewed by:	HMM	Drawing code:	
Submitted by:	HMM	File name:	Plot date: June 2014
		Plot scale:	See Plan

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